UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,330	01/30/2004	Yoshihiko Nagamine	K2020.0002/P002	5218

24998 7590 07/19/2006

DICKSTEIN SHAPIRO LLP
1825 EYE STREET NW
Washington, DC 20006-5403

EXAMINER	
ARTMAN, THOMAS R	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 07/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/767,330	NAGAMINE ET AL.	
	Examiner	Art Unit	
	Thomas R. Artman	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 June 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20 and 22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20 and 22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 24th, 2006, has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blair (US 5,825,845) in view of Kunieda (US 6,307,914 B1).

Regarding claims 1 and 17, Blair discloses a patient positioning device for positioning a patient couch (Figs.1 and 2) and method of operation (Fig.6), including:

a) an X-ray emission device 106,

b) an X-ray entry device 112 for receiving the X-ray emitted from the emission device and outputting an output signal (arrows in Fig.1) depending upon the received X-ray,

c) an image information generator for generating second image information regarding a portion of the patient 108 lying across the path 146 of the particle beam by using the output signal outputted from the X-ray entry device (col.6, lines 23-30),

d) a processing unit (Fig.6) for (col.12, lines 37-44 and 54-62):

e) setting a first set area including an isocenter with respect to a first image information (DRR) which serves as a reference image prepared beforehand based on image data of a tumor in the body of the patient and including the isocenter (col.1, line 59, through col.2, line 7; col.10, lines 2-13; also see steps 402, 404 and 406 of Fig.6),

f) setting a second set area including a position corresponding to the path of the charged particle beam with respect to the second image information (step 416 of Fig.6),

g) executing pattern matching 422 between the first image information in the first set area 404 and the second image information 416 in the second set area within an area of the second image information to extract the second set area having the second image information most similar to the first image information in the first set area, thereby producing information 426 used for positioning the couch 150 (col.3, line 56, through col.4, line 18) based on the extracted second set area (col.11, line 41, through col.13, line 9).

Further regarding both claims, Blair does not specifically disclose that the first and second set areas are smaller than the entire acquired images, nor does Blair specifically disclose that the second set area is moved within the second image in order to extract the second set area similar to the first set area.

Kunieda teaches a pattern matching algorithm for aligning a radiation treatment beam with a patient isocenter (col.14, lines 15-52). Kunieda teaches that faster image recognition can be achieved for moving targets (such as through cardiac or respiratory cycles, etc.) by setting a second set area smaller than the area of the image (Fig.16) that is moved in order to find the matching portion to a corresponding first set area more efficiently.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Blair to have a second set area smaller than the whole image that is moved, as taught by Kunieda, in order to more efficiently align the target with the treatment beam.

With respect to claim 2, Blair further discloses a couch controller (not shown) for controlling the movement of the couch according to the positioning information.

With respect to claim 3, Blair further discloses that the processing unit executes the pattern matching by using information of a plurality of pixels contained in the first image information in the first set area and information of a plurality of pixels contained in the second image information in the second set area (see at least step 422 of Fig.6).

With respect to claim 4, Blair further discloses that the least squares method is used to produce the positioning information (col.12, lines 19-20).

With respect to claim 19, Blair further discloses that the X-ray emission device is mounted to the particle beam irradiation system such that it can be moved to first and second

positions which correspond to being moved into and out of the path 146 of the charged particle beam, respectively, and further where the X-ray emission device emits in the first position (col.6, lines 23-53).

Regarding claim 5, Blair discloses a patient positioning device for positioning a patient couch (Figs.1 and 2), including:

a) an X-ray emission device 106,

b) an image information generator for generating second image information regarding a portion of the patient 108 lying across the path 146 of the particle beam by using a signal depending on the X-ray emitted from the X-ray emission device (col.6, lines 23-30),

c) a display unit 420 (col.11, lines 41-50) for displaying first image information representing a tumor in the body of the patient and serving as a reference image prepared beforehand including the isocenter (col.10, lines 2-13), and the second image information, and

d) a processing unit (Fig.6) for setting a first set area including the isocenter (steps 406 and 410) with respect to the first image information, setting a second set area including a position corresponding to the path 146 of the charged particle beam with respect to the second image information (step 416), displaying a frame showing the first set area and a frame showing the second set area on the display unit, and

e) executing pattern matching 422 between a first image information 106 in a first set area and the second image information 416 in a second set area within an area of the second image information to extract the second set area having the second image information most similar to the first image information in the first set area (col.12, lines 37-62), thereby producing

information 426 used for positioning the couch 150 (col.3, line 56, through col.4, line 18) based upon the extracted second set area.

Further regarding claim 5, Blair does not specifically disclose that the first and second set areas are smaller than the entire acquired images, nor does Blair specifically disclose that the second set area is moved within the second image in order to extract the second set area similar to the first set area.

Kunieda teaches a pattern matching algorithm for aligning a radiation treatment beam with a patient isocenter (col.14, lines 15-52). Kunieda teaches that faster image recognition can be achieved for moving targets (such as through cardiac or respiratory cycles, etc.) by setting a second set area smaller than the area of the image (Fig.16) that is moved in order to find the matching portion to a corresponding first set area more efficiently.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Blair to have a second set area smaller than the whole image that is moved, as taught by Kunieda, in order to more efficiently align the target with the treatment beam.

With respect to claim 6, Blair further discloses that the display unit has first and second display units 130 and 132 for displaying the first and second images.

With respect to claim 7, Blair further discloses that the image information generator has an X-ray transducer 114 for converting the X-rays to visible light and a camera 116 to capture the light and produce the second image information.

With respect to claim 8, Blair further discloses that the image information generator further has a camera 116 that has the semiconductor-based detector structure as claimed.

With respect to claim 9, Blair further discloses that the processing unit executes the pattern matching by using information of a plurality of pixels contained in the first image information in the first set area and information of a plurality of pixels contained in the second image information in the second set area (see at least step 422 of Fig.6).

With respect to claim 10, Blair further discloses that the least squares method is used to produce the positioning information (col.12, lines 19-20).

Regarding claims 11 and 18, Blair discloses a patient positioning device and method for positioning a patient couch (Figs.1, 2 and 6), including:

a) an X-ray emission device 106,

b) an image information generator for generating second image information regarding a portion of the patient 108 lying across the path 146 of the particle beam by using a signal depending on the X-ray emitted from the X-ray emission device (col.6, lines 23-30),

c) a processing unit (Fig.6) for:

d) setting a first set area including the isocenter (steps 406 and 410) with respect to the first image information which serves as a reference image prepared beforehand based on image data of a tumor in the body of the patient and including the isocenter (col.10, lines 2-13),

e) setting a second set area with respect to the second image information and having substantially the same size as the first set area and including a position corresponding to the path 146 of the charged particle beam with respect to the second image information (steps 416 and 422),

f) executing primary pattern matching 422 between a first image information 106 in a first set area and the second image information 416 in a second set area within an area of the second image information to extract the second set area having the second image information most similar to the first information in the first set area (col.12, lines 37-62), and

g) executing secondary pattern matching 424 between the first set area and extracted second set area for producing information 426 used for positioning the couch 150 (col.3, line 56, through col.4, line 18; col.12, lines 14-36).

Further regarding both claims, Blair does not specifically disclose that the first and second set areas are smaller than the entire acquired images, nor does Blair specifically disclose that the second set area is moved within the second image in order to extract the second set area similar to the first set area.

Kunieda teaches a pattern matching algorithm for aligning a radiation treatment beam with a patient isocenter (col.14, lines 15-52). Kunieda teaches that faster image recognition can be achieved for moving targets (such as through cardiac or respiratory cycles, etc.) by setting a second set area smaller than the area of the image (Fig.16) that is moved in order to find the matching portion to a corresponding first set area more efficiently.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Blair to have a second set area smaller than the whole image that is moved, as taught by Kunieda, in order to more efficiently align the target with the treatment beam.

With respect to claim 12, Blair further discloses a couch controller (not shown) for controlling the movement of the couch according to the positioning information.

With respect to claim 13, Blair further discloses that the processing unit executes the pattern matching by using information of a plurality of pixels contained in the first image information in the first set area and information of a plurality of pixels contained in the second image information in the second set area (see at least step 422 of Fig.6).

With respect to claim 14, Blair further discloses that the least squares method is used to produce the positioning information (col.12, lines 19-20).

With respect to claim 15, the Blair/Kunieda prior art combination further teaches that the processing unit outputs information for displaying the first and second image information to a display unit that displays the first and second set areas of the first and second image information.

With respect to claim 16, Blair further discloses that the display unit has first and second display units 130 and 132 for displaying the first and second images.

Regarding claim 20, Blair discloses a particle beam generator (Figs.1 and 2), including:

a) a particle beam generator (Fig.2),

b) a particle beam irradiation system 102 for irradiating a charged particle beam supplied by the particle beam generator to a tumor of a patient 108,

c) a couch 150 for supporting the patient,

d) a patient positioning device (Fig.1), including:

e) an X-ray emission device 106,

f) an X-ray entry device 112 for receiving the X-ray emitted from the emission device and outputting an output signal (arrows in Fig.1) depending upon the received X-ray,

g) an image information generator for generating second image information regarding a portion of the patient 108 lying across the path 146 of the particle beam by using the output signal outputted from the X-ray entry device (col.6, lines 23-30),

h) a processing unit (Fig.6) for (col.12, lines 37-44 and 54-62):

e) setting a first set area including an isocenter with respect to a first image information (DRR) which serves as a reference image prepared beforehand based on image data of a tumor in the body of the patient and including the isocenter (col.1, line 59, through col.2, line 7; col.10, lines 2-13; also see steps 402, 404 and 406 of Fig.6),

f) setting a second set area including a position corresponding to the path of the charged particle beam with respect to the second image information (step 416 of Fig.6),

g) executing pattern matching 422 between the first image information in the first set area 404 and the second image information 416 in the second set area within an area of the second image information to extract the second set area having the second image information most

similar to the first image information in the first set area, thereby producing information 426 used for positioning the couch 150 (col.3, line 56, through col.4, line 18) based on the extracted second set area (col.11, line 41, through col.13, line 9).

Further regarding claim 20, Blair does not specifically disclose that the first and second set areas are smaller than the entire acquired images, nor does Blair specifically disclose that the second set area is moved within the second image in order to extract the second set area similar to the first set area.

Kunieda teaches a pattern matching algorithm for aligning a radiation treatment beam with a patient isocenter (col.14, lines 15-52). Kunieda teaches that faster image recognition can be achieved for moving targets (such as through cardiac or respiratory cycles, etc.) by setting a second set area smaller than the area of the image (Fig.16) that is moved in order to find the matching portion to a corresponding first set area more efficiently.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Blair to have a second set area smaller than the whole image that is moved, as taught by Kunieda, in order to more efficiently align the target with the treatment beam.

Regarding claim 22, Blair discloses a patient positioning device for positioning a patient couch (Figs.1 and 2) and method of operation (Fig.6), including:

a) an X-ray emission device 106,

b) an X-ray entry device 112 for receiving the X-ray emitted from the emission device and outputting an output signal (arrows in Fig.1) depending upon the received X-ray,

c) an image information generator for generating second image information regarding a portion of the patient 108 lying across the path 146 of the particle beam by using the output signal outputted from the X-ray entry device (col.6, lines 23-30),

d) a processing unit (Fig.6) for (col.12, lines 37-44 and 54-62):

e) setting a first set area including an isocenter with respect to a first image information (DRR) which serves as a reference image prepared beforehand based on image data of a tumor in the body of the patient and including the isocenter (col.1, line 59, through col.2, line 7; col.10, lines 2-13; also see steps 402, 404 and 406 of Fig.6),

f) setting a second set area including a position corresponding to the path of the charged particle beam with respect to the second image information (step 416 of Fig.6),

g) executing pattern matching 422 between the first image information in the first set area 404 and the second image information 416 in the second set area within an area of the second image information to extract the second set area having the second image information most similar to the first image information in the first set area, thereby producing information 426 used for positioning the couch 150 (col.3, line 56, through col.4, line 18) based on the extracted second set area (col.11, line 41, through col.13, line 9).

Further regarding claim 22, Blair does not specifically disclose that the first and second set areas are smaller than the entire acquired images, nor does Blair specifically disclose that the second set area is moved within the second image in order to extract the second set area similar to the first set area.

Kunieda teaches a pattern matching algorithm for aligning a radiation treatment beam with a patient isocenter (col.14, lines 15-52). Kunieda teaches that faster image recognition can be achieved for moving targets (such as through cardiac or respiratory cycles, etc.) by setting a second set area smaller than the area of the image (Fig.16) that is moved in order to find the matching portion to a corresponding first set area more efficiently.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Blair to have a second set area smaller than the whole image that is moved, as taught by Kunieda, in order to more efficiently align the target with the treatment beam.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-20 and 22 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 19-39 of copending Application No. 11/432,363. Although the conflicting claims are not identical, they are not patentably distinct from each other because independent claims 19, 23, 29, 35, 36, 38 and 39 of the copending Application additionally disclose that the information used to position the patient couch is based on a positional offset between the second set area before movement by the pattern matching and the second set area after pattern matching.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

Applicant's arguments with respect to claims 1-20 and 22 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R. Artman whose telephone number is (571) 272-2485. The examiner can normally be reached on 9am - 5:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Thomas R. Artman
Patent Examiner
7/11/06

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER